

GEOTECHNICAL REPORT

Client: Celeste van der Walt

Project: Erf 155 Keurboomstrand, Plettenberg Bay

Date: 11.12.2020

Geotechnical Constraint	Risk			NHBC Classification
	Low	Medium	High	
Active clay	X			
Compressible soil	X			S
Collapsible soil	X			
Imported/uncontrolled fill	X			
Chemically aggressive soils	X			
Saturated soils/ groundwater seepage	X			
Shallow hard rock/ difficult excavations		X		R
Slope stability problems		X		
Flood potential	X			
Seismicity	X			
Dolomitic land	X			

Disclaimer: The above classification is provided as a guideline and is true for the specific locations that were tested and may not be true for the entire site.

Introduction and terms of reference:

A broad-scope geotechnical site investigation was commissioned by the client to establish the geology and geotechnical conditions and constraints for the purpose of the planning and design of one or more new residential structures on the site. No site development plan or architectural plans were available at the time of the investigation. The investigations were carried out by geotechnical professionals in accordance with SANS 10400-H.

Site description and surface conditions:

The site is a potentially developable portion of Remainder of Erf 155 Keurboomstrand, which is a vacant stand, 5.6Ha in extent, located on a south-facing slope, which overlooks the ocean. The proposed development area is a relatively small portion of the stand on the eastern side with a gentle to moderate gradient, which becomes steep to very steep towards the east, west and south

(see Fig 1&2). The site is accessible via servitude from Main St along the northern boundary. At the time of the investigation, the site was covered in thick indigenous vegetation, and the ground conditions were generally dry, well drained and stable with no signs of groundwater seepage, well-defined natural watercourses, springs, marshy areas or any major stability problems.

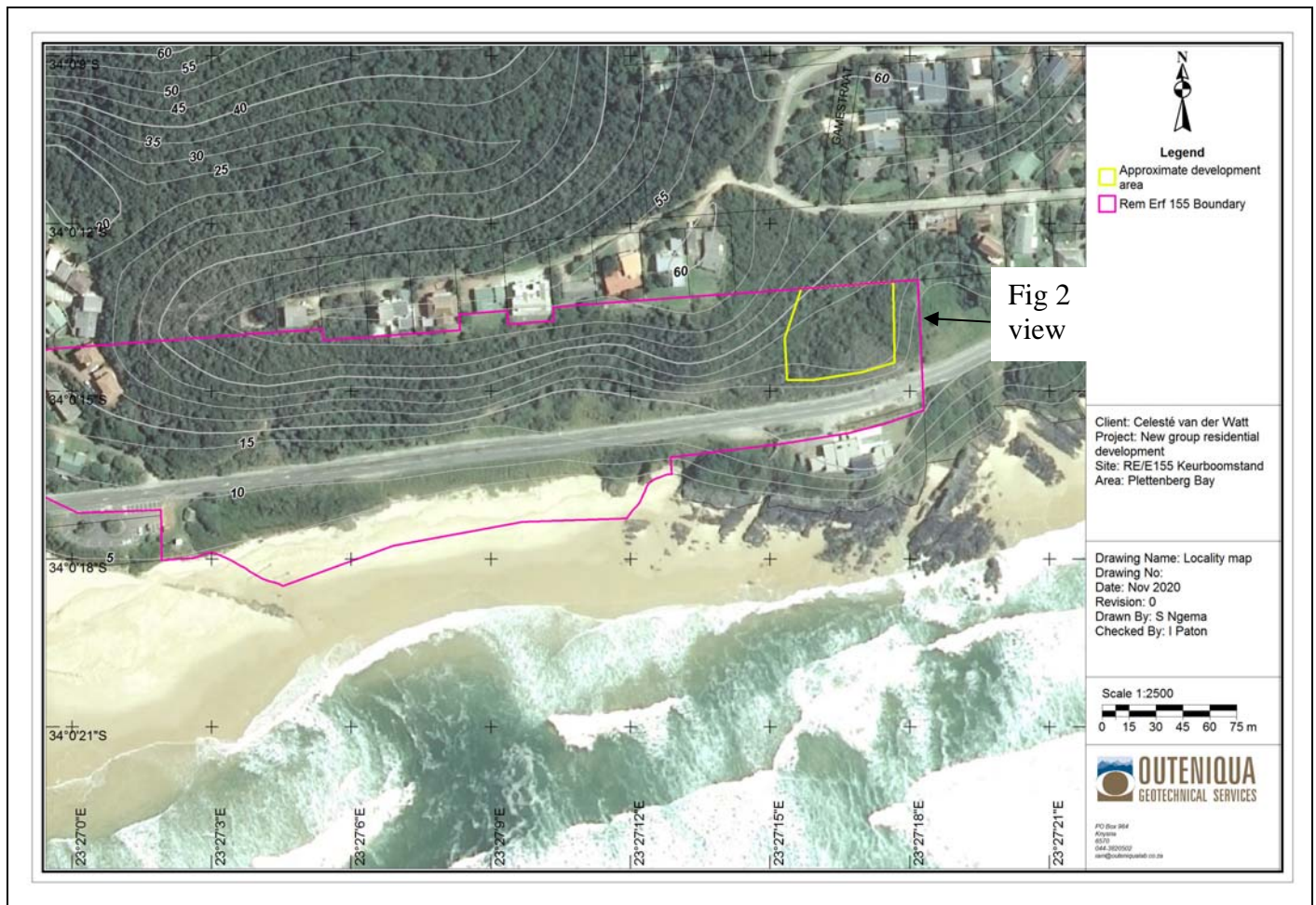


Figure 1: Locality map of site showing approximate proposed development area



Figure 2: View looking west towards the proposed development area on the hill

Geology and soil profile:

The site is underlain by feldspathic sandstone and shale of the Silurian Baviaanskloof Formation of the Table Mountain Group, which is clearly visible on the steep slopes near the southern boundary (see Figure 4&5). The bedrock is locally overlain by alluvial and/or colluvial silty sand, gravel and cobbles.

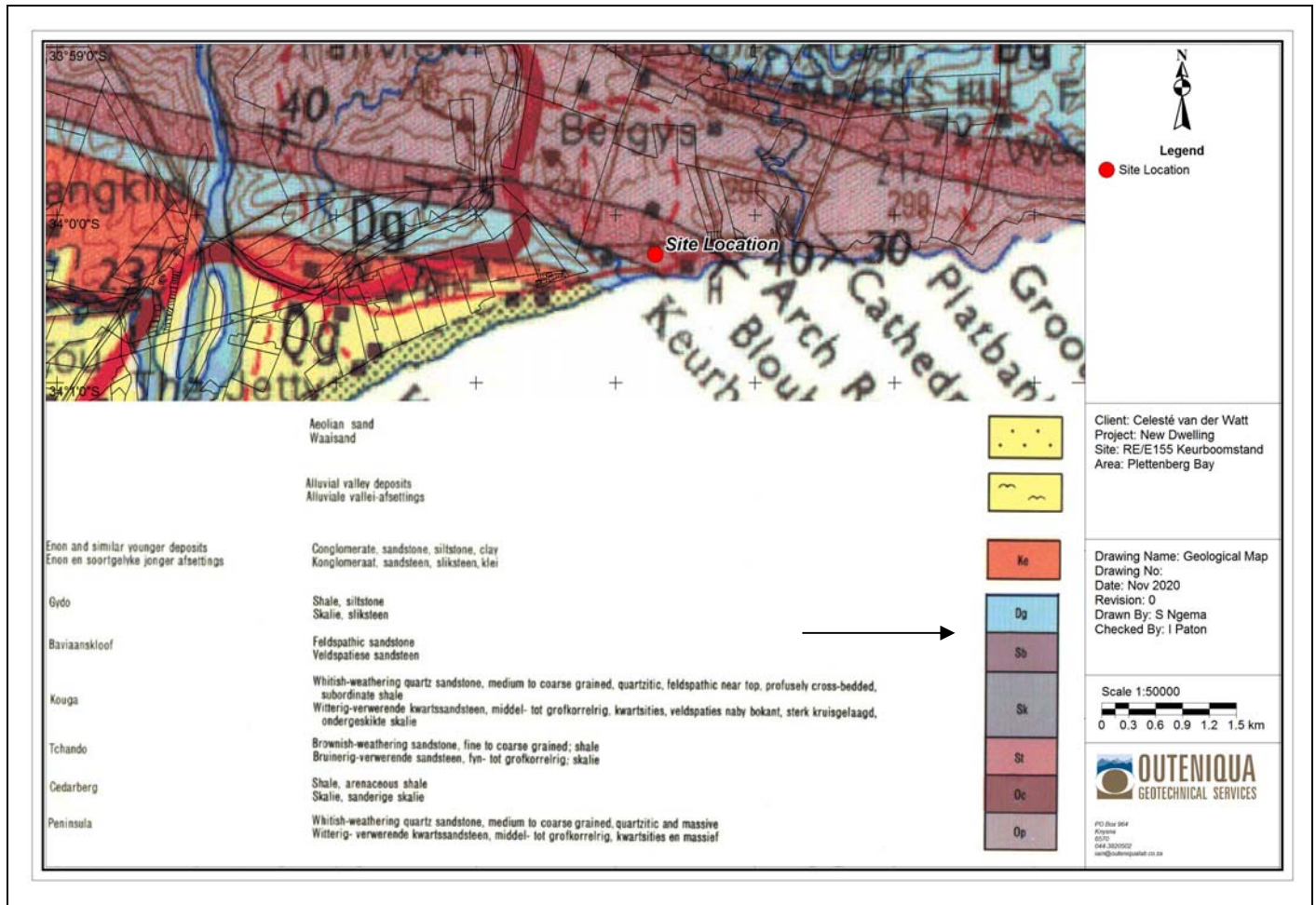


Figure 4: Geological map of site



Figure 5: Feldspathic sandstone and shale of the Baviaanskloof Formation exposed on steep slopes below the site

Test pits conducted on the site (see Figure 6&7) recorded a general soil profile consisting of silty sandy gravel and cobbles of colluvial origin, overlying bedrock shale and feldspathic sandstone of

the Baviaanskloof Formation. Two test pits refused on this rock at a depth of 0.5m below NGL, and one test pits refused on very dense colluvial cobbles at a depth of 0.8m BNGL. Insitu penetration tests (DCP) refused on this rock or very dense cobbles at a maximum depth of 0.45m BNGL. No clay or any other highly problematic soils were encountered in the test pits and the general subsurface conditions were found to be highly favourable for structural loading. No lab tests were necessary due to the presence of shallow hard rock which provides a highly suitable founding medium.

Some localised stability issues were noted along the edge of the very steep slope along the southern boundary with the Keurboomstrand Road (MR394), where a tension crack has developed along the edge of the cliff (See Figure 8). This is a localized phenomenon and the cracks do not extend further back than 1m from the top of the slope.



Figure 6: Plan of test positions

Recommendations:

Earthworks: The presence of shallow rock may hamper earthworks and deep excavations but will generally provide a highly stable and suitable founding medium. Excavations deeper than 0.5m can be provisionally classified as “hard”, requiring mechanical wedging and splitting (e.g. jackhammer/hydraulic pecker). No blasting is likely to be permitted in this residential area. It proposed that the proposed dwellings are designed and positioned in a manner which will take into account the terrain and underlying geotechnical conditions, such that minimal earthworks or terracing will be necessary (i.e. split levels or suspended structures).

The insitu soil and weathered rock is suitable for use as general fill material under surface beds and around foundations, less any oversize rock fragments and boulders >100mm.

No earthworks or development is recommended on slopes steeper than 1:4, unless special engineering solutions are developed, and no development is recommended within a buffer zone of 5m from the top of slopes which exceed a gradient of 1:2 (most notably along the southern boundary).



Figure 7: Bedrock exposed in test pits



Figure 8: Tension crack along the edge of very steep slope on southern boundary

Foundations & floors: Single and/or double storey masonry or timber structures can be founded on conventional strip/pad foundations on clean, tight bedrock at a minimum depth of 0.5m below GL. Light reinforcement of strip footings is recommended to span across irregular rock/ soil ground conditions that may occur in linear trenches. A safe design bearing pressure on very soft, highly weathered bedrock is 250kPa. But since foundations may span across rock and soil, bearing pressures should be kept to max 150kPa. The engineer should inspect foundations before casting to ensure suitable founding conditions and no undetected problems or areas where no rock was encountered in trenches. Specialist geotechnical advice should be sought in cases where the conditions encountered in foundation trenches differ vastly from that reported in the investigations. Fill material supporting ground floor concrete surface beds must be minimum G7 quality, compacted to 95% MDD and tested for approval by the engineer. Suspended floor slabs should be considered where fill heights are excessive to minimise importation of fill.

Driveway & parking areas: The subgrade conditions along the access road are likely to be good (gravelly) and will suffice as a selected layer. The access road should be cut with adequate camber for side drains to a roadbed level of approximately NGL-350mm, compacted to 93%MDD, and an imported G5 subbase layer of 150mm thick placed and compacted to 95%MDD. Cement/clay brick pavers can be placed on 20mm bedding sand.

Drainage: Vertical infiltration of stormwater will be restricted due to shallow rock, resulting in a significant percentage of run-off from the site. Effective stormwater drainage systems are recommended to collect, handle and discharge stormwater across the site such that it does not cause erosion on slopes or undermining of structures. Subsoil drains are required behind any retaining walls as standard practice.

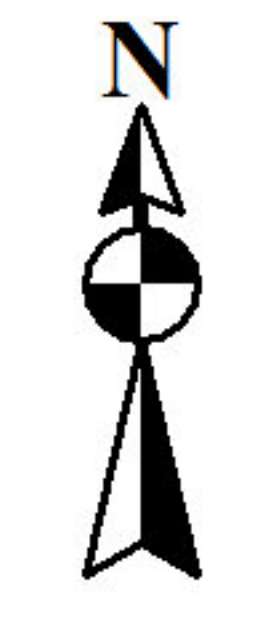
Conclusions:

The investigation indicates generally favourable geotechnical conditions for the proposed development and the site is considered generally suitable in terms of these conditions but there are some constraints that may require consideration from the designers.




A stylized, handwritten signature in black ink, consisting of several overlapping loops and lines.

Iain Paton Pr Sci Nat Pr Tech Eng

Appendix A
Test data

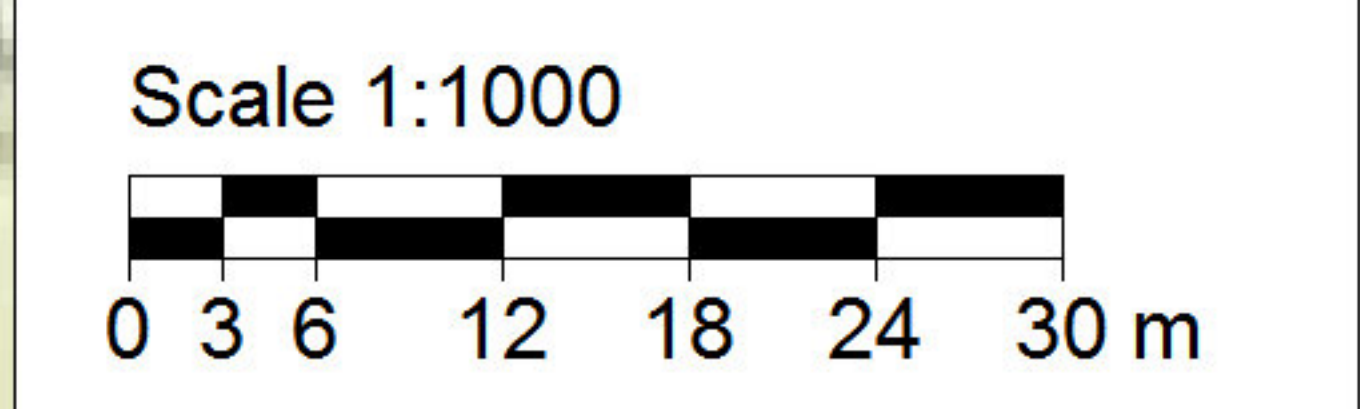


Legend

-  Test positions
-  Approximate development area
-  Rem Erf 155 Boundary

Client: Celesté van der Watt
 Project: New group residential development
 Site: RE/E155 Keurboomstand
 Area: Plettenberg Bay

Drawing Name: Test positions
 Drawing No:
 Date: Nov 2020
 Revision: 0
 Drawn By: S Ngema
 Checked By: I Paton



PO Box 964
 Knysna
 6570
 044-3820502
 iain@outeniqualab.co.za



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Geotechnical Soil Profile

Client:	Celesté van der Watt
Project:	Erf 155 Keurboomstrand
Area:	Plettenberg Bay
Date:	23.11.2020
Excavator:	By Hand

		Datum: NGL		Co-ords: 23 Y-042014 X3764168		Dynamic Cone Penetrometer (DCP)	Photo of Test Pit
	TP 1	Key to symbols: ● Sample taken		Groundwater			
	(0 to 400)	Moist, dark brown, medium dense, intact, SILTY SAND, GRAVEL & COBBLES with organic matter (roots) , colluvial (topsoil).					
	(400 to 500)	Dark grey, stained light red orange, & brown, highly weathered, finely grained, highly foliated, highly fractured & jointed, soft rock, Baviaanskloof Formation SHALE/FELDSPATHIC SANDSTONE .					
		Refusal on rock @ 500mm					
		No Water					
	TP 2	Key to symbols: ● Sample taken		Groundwater			
	(0 to 200)	Moist, dark brown, medium dense, intact, SILTY SAND, GRAVEL & COBBLES with organic matter (roots) , colluvial (topsoil).					
	(200 to 500)	Dark grey, stained light red orange, & brown, highly weathered, finely grained, highly foliated, highly fractured & jointed, soft rock, Baviaanskloof Formation SHALE/FELDSPATHIC SANDSTONE .					
		Refusal on rock @ 500mm					
		No Water					



OUTENIQUA

GEOTECHNICAL SERVICES

Geotechnical Soil Profile

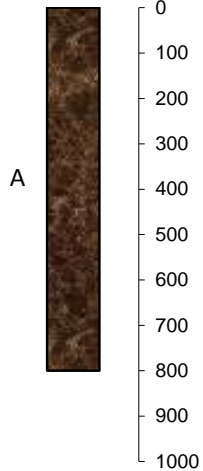
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Project:	Erf 155 Keurboomstrand
Area:	Plettenberg Bay
Date:	23.11.2020
Excavator:	By Hand

TP 3

Datum:	NGL	Co-ords:	23 Y-041994 X3764187
Key to symbols:	● Sample taken	▼	Groundwater

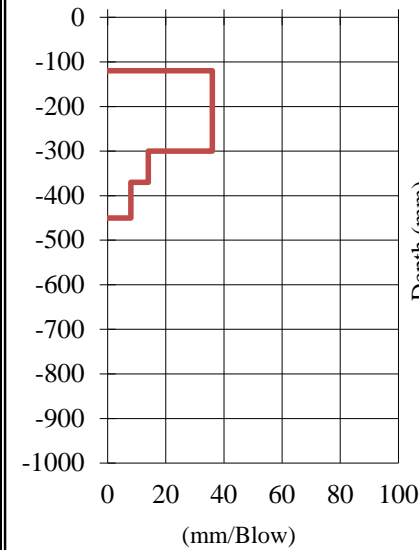
Dynamic Cone Penetrometer (DCP)

Photo of Test Pit



(0 to 800) Moist, light-dark brown, medium dense to very dense, matrix supported, **GRAVEL & COBBLES & BOULDERS IN SILTY SANDY MATRIX**, colluvial.

Refusal @ 800mm on very dense cobbles
No Water





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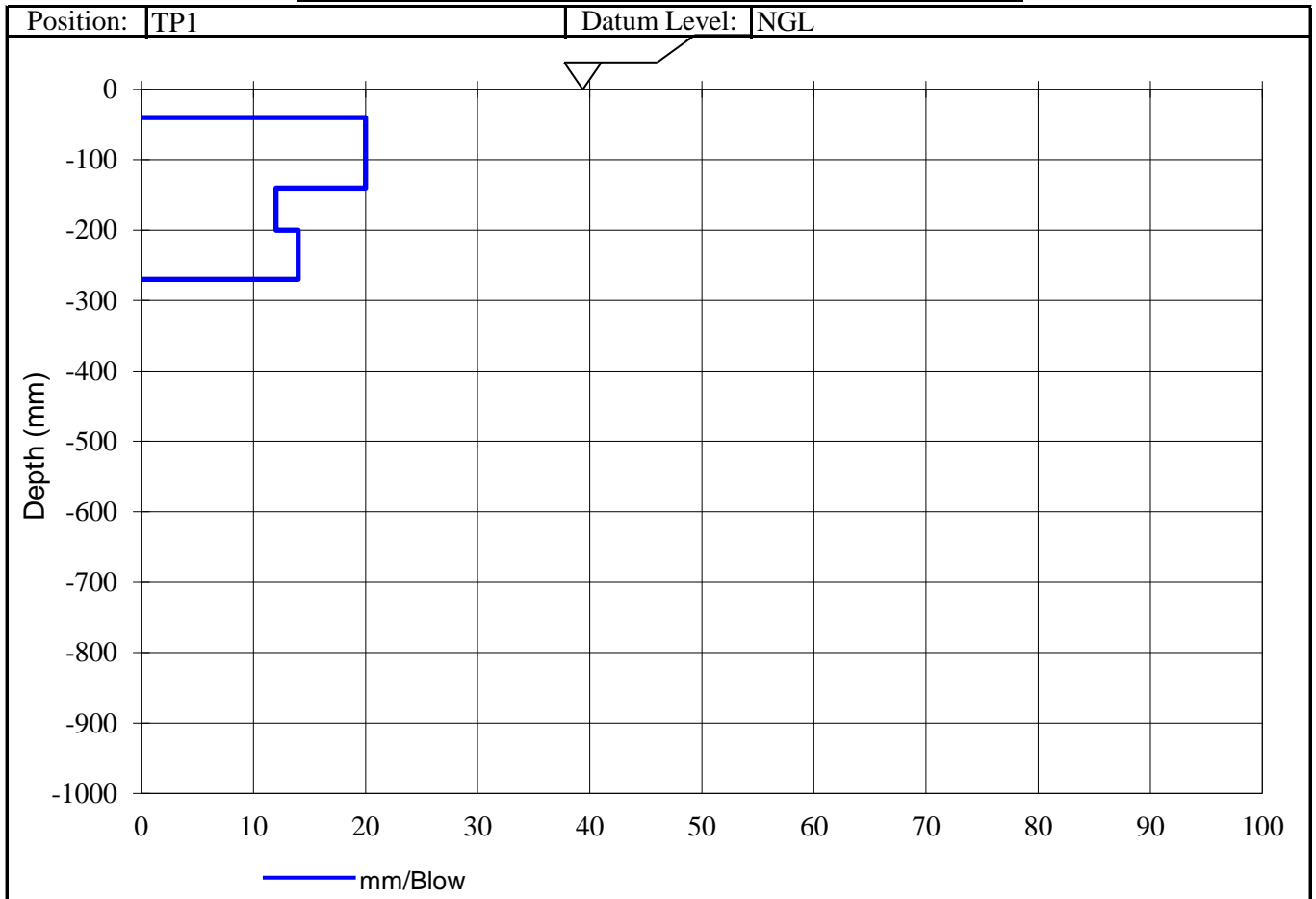
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Tel: 044 3820502 : Fax: 044 3820503 : e-mail: iain@outeniqualab.co.za

Customer :	Celesté van der Watt	Project :	Erf 155, Keurboomstrand
	P.O. Box 35097	Date Received :	19.11.2020
	Menlo Park	Date Reported :	24.11.2020
	0102	Req. Number :	
Attention :	Celeste van der Watt	No. of Pages :	1 of 6

TEST REPORT

Dynamic Cone Penetrometer (DCP) - (TMH 6 Method ST6)



I Paton (Member)
 For Outeniqua Geotech. Services cc.
 Technical Signatory

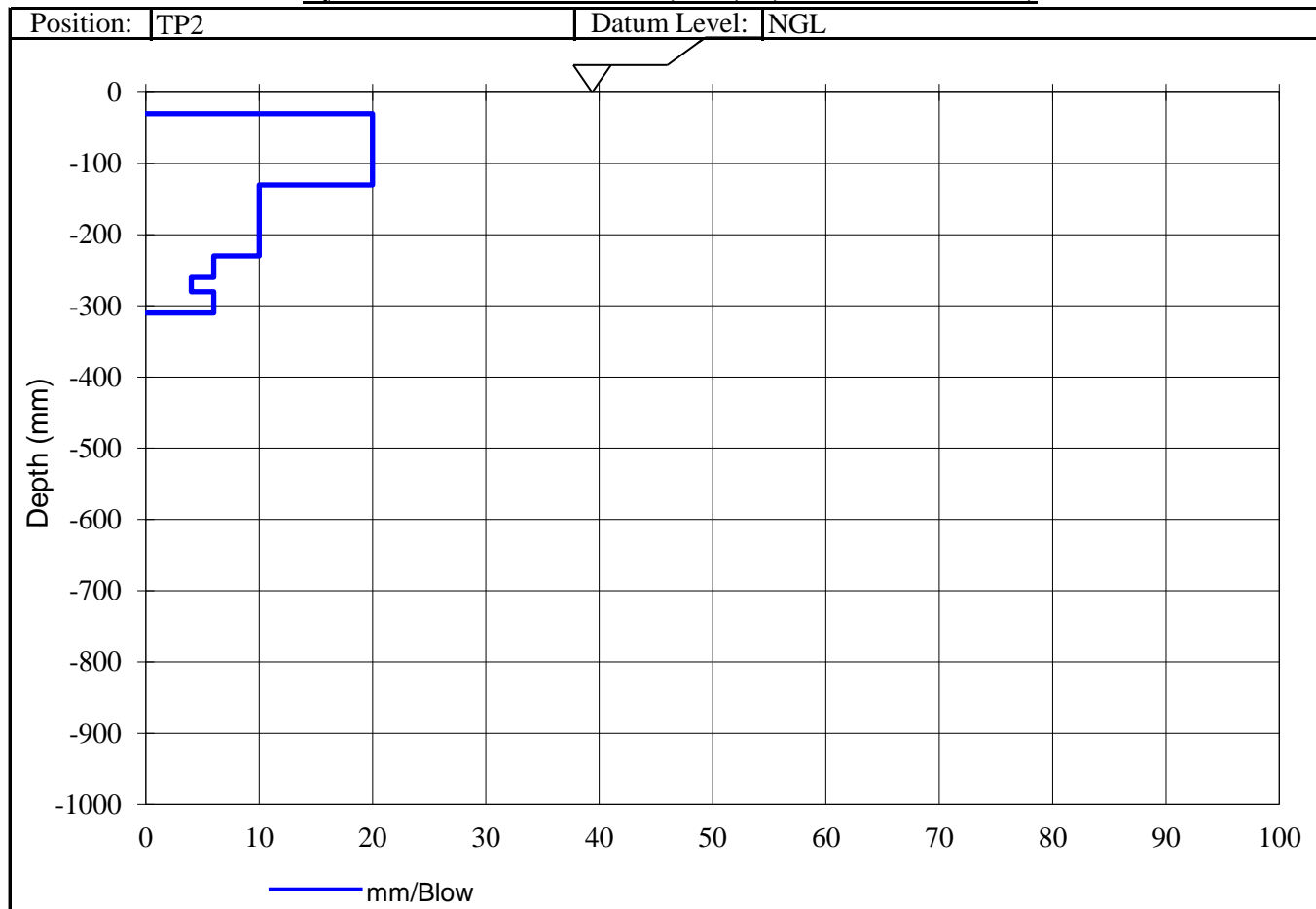
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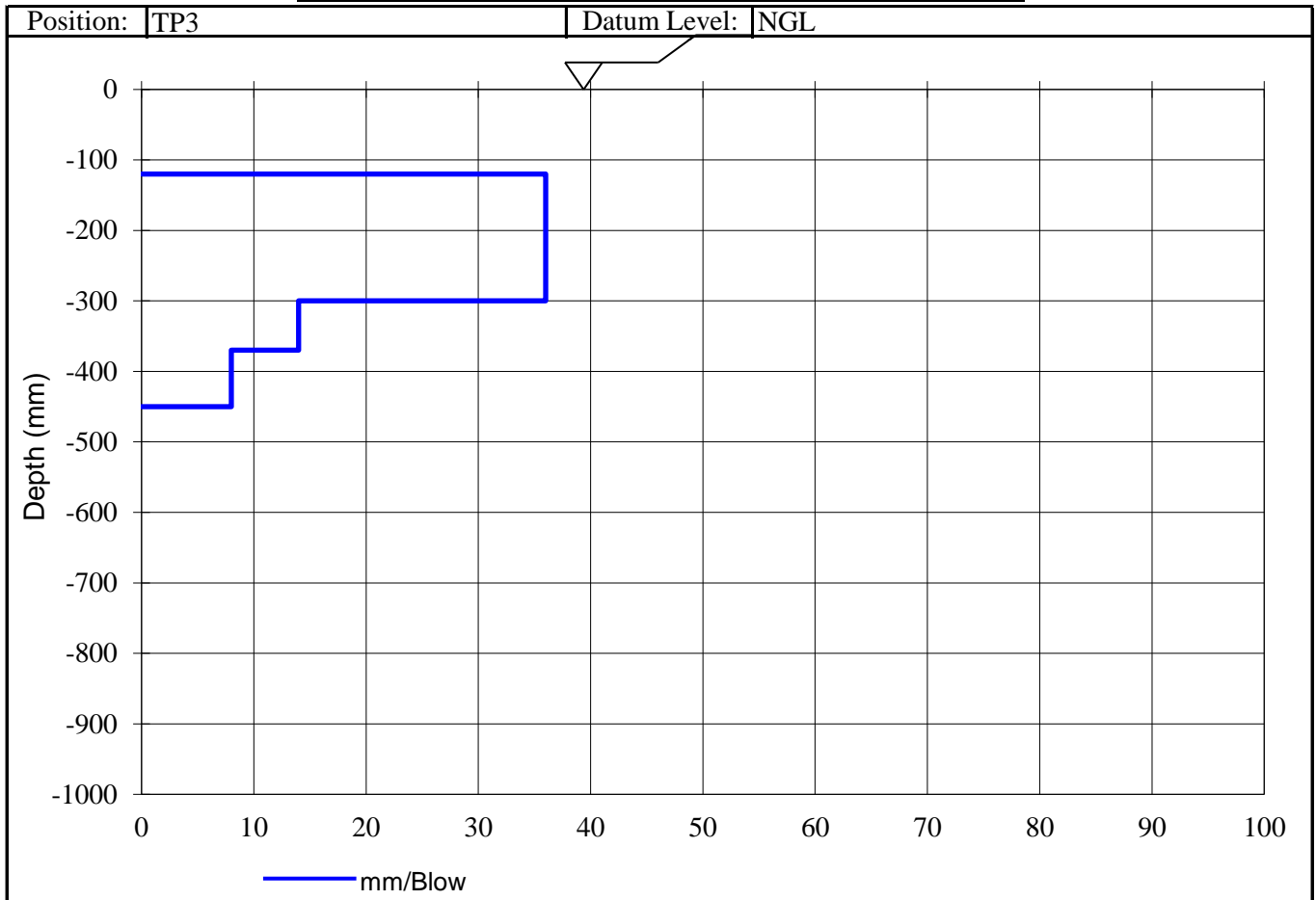
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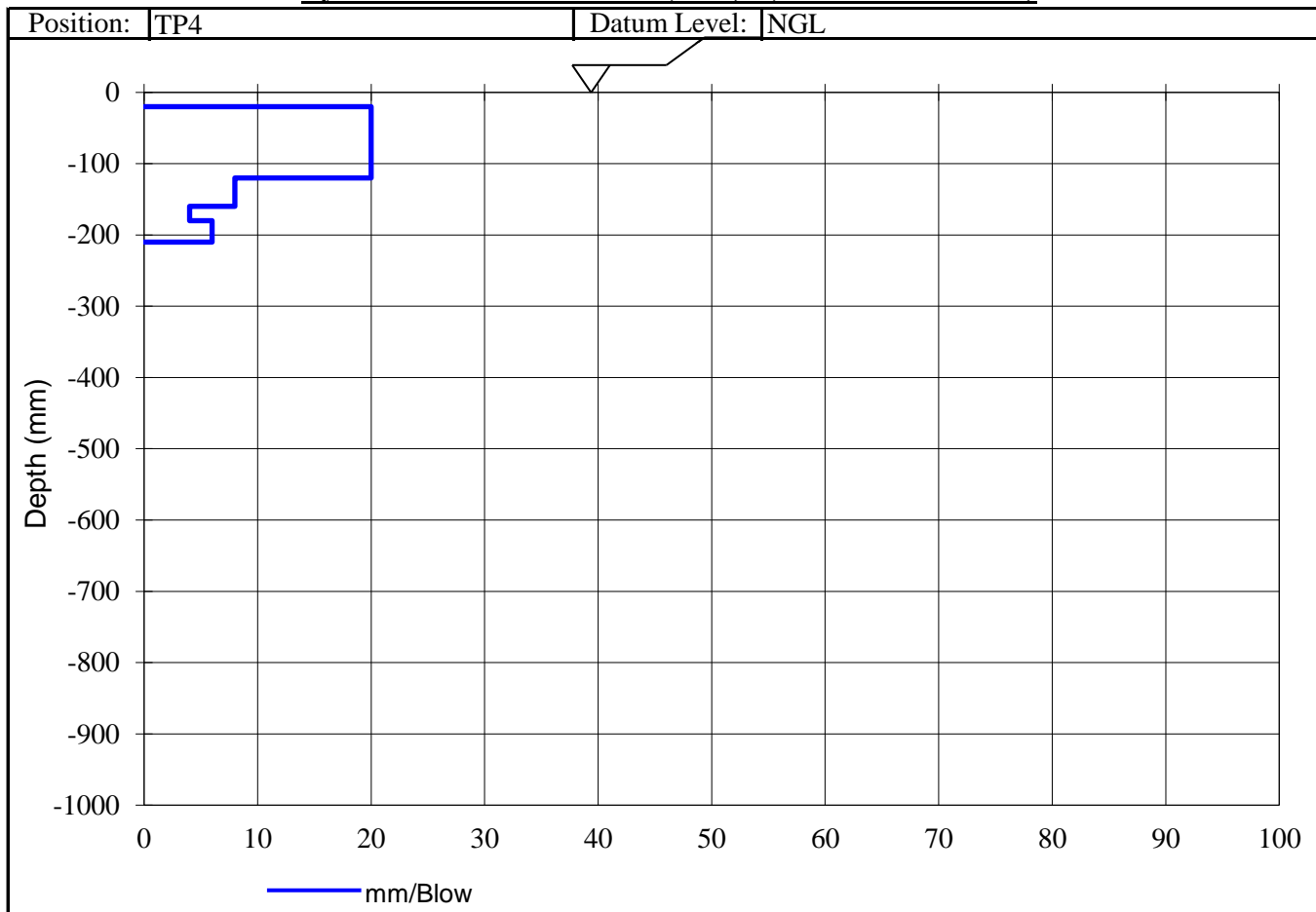
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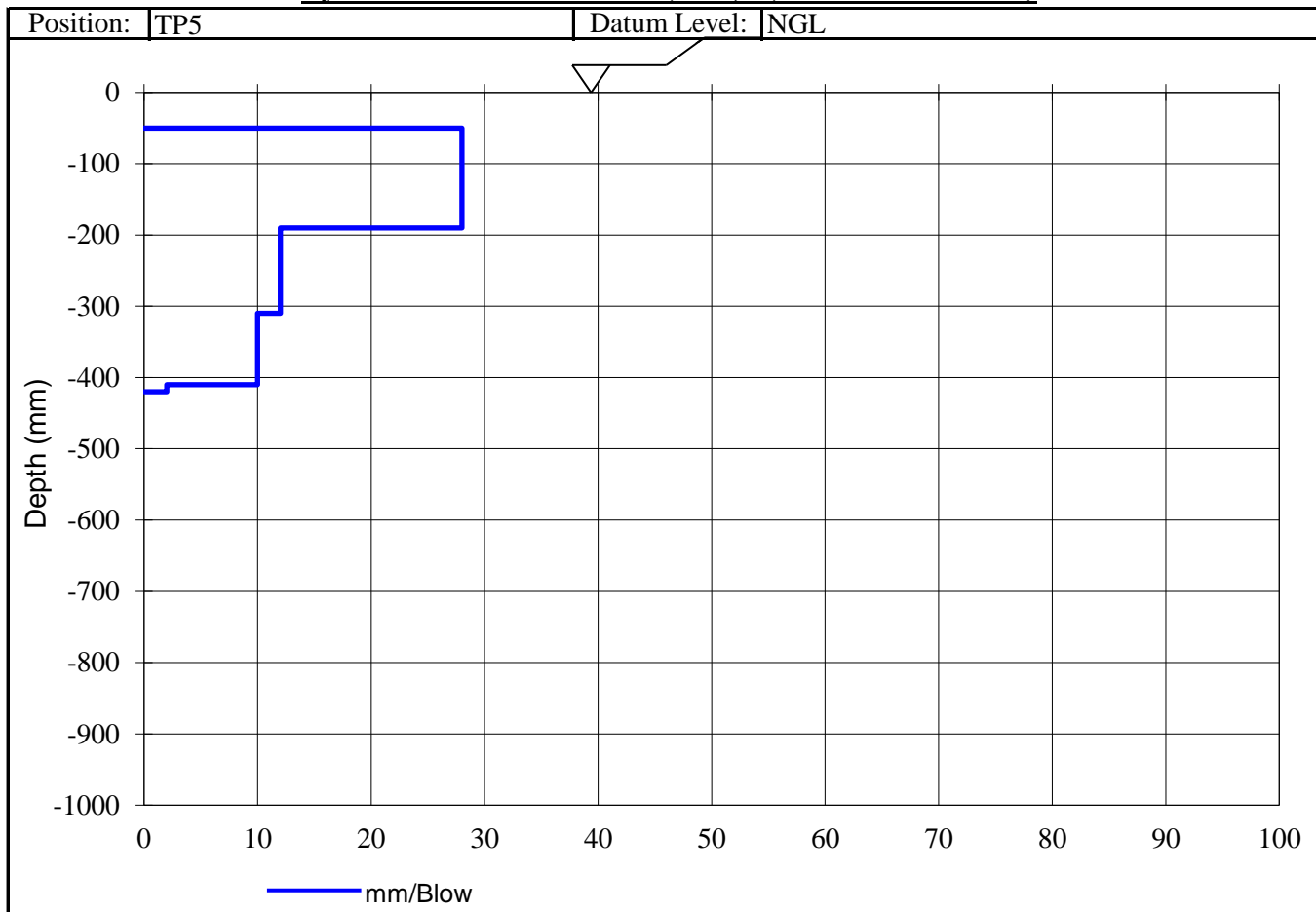
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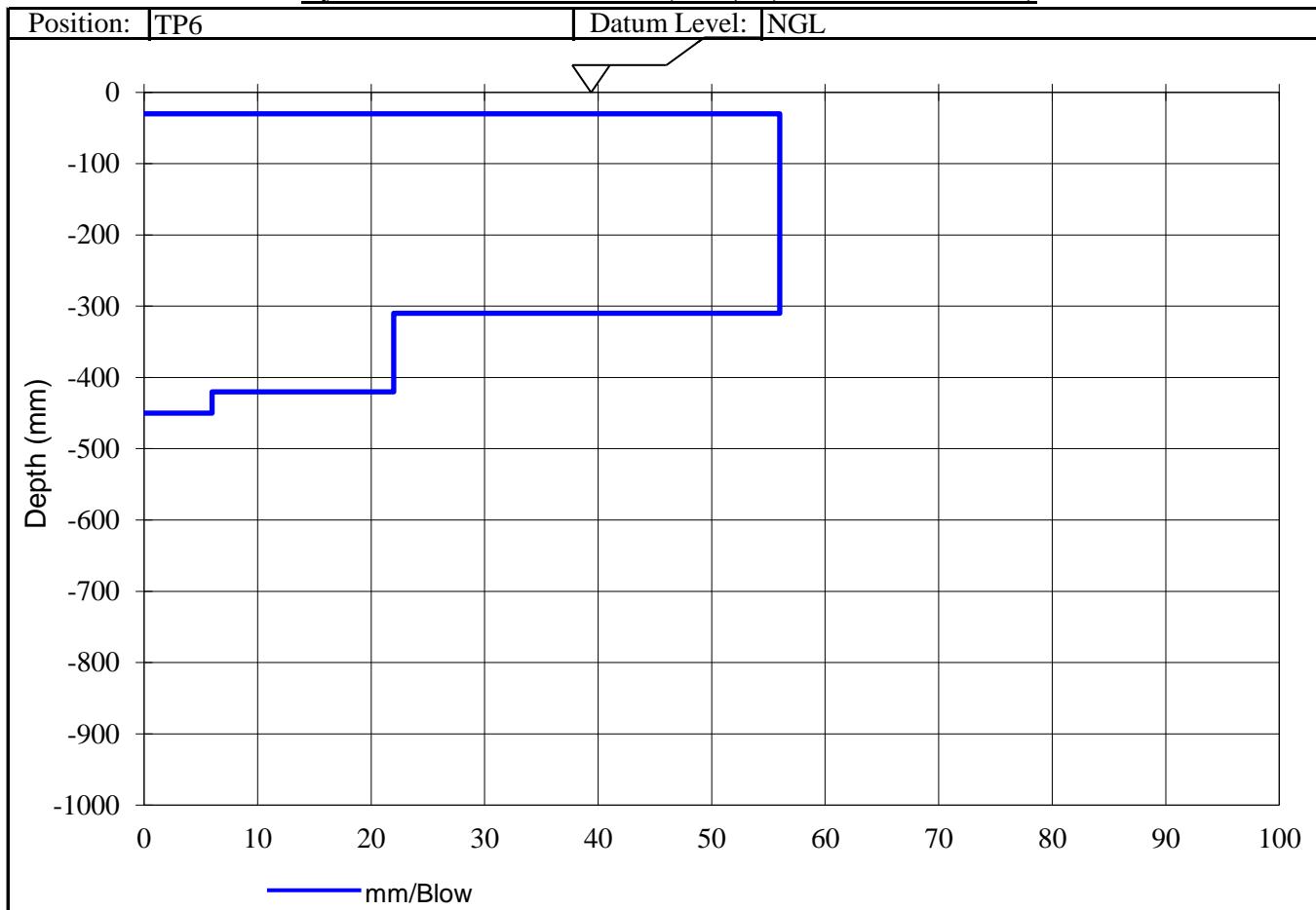
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